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### Inclusive design and pedagogy

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## **Inclusive Design and Pedagogy: An Outline of Three Innovations**

### **Abstract**

How effectively is 'inclusive design' taught in schools of architecture? What different forms, both implicit and explicit, do approaches to the subject take? What key approaches do we need to teach architecture students so they are equipped to deliver inclusive-for-all environments?

We engage with these questions by focusing on 'inclusive design' pedagogy, providing a critical overview of learning requirements, and teaching strategies. Drawing on our own experience in a Scottish school of architecture, we discuss three case studies that featured innovative approaches to the subject. In the first, students and older adults co-designed proposals for 'age-friendly' environments, the second considers social responsibility and inclusion, through a five-year engagement with a community and the third consisted of a regulatory drawing exercise. We demonstrate that inclusive design in architectural education traditionally begins and ends with regulatory compliance, minimum standard provision and physical access. We detail alternative approaches and the benefits these can bring; for example, approaches that treat regulatory frameworks as opportunities for innovation, and approaches that focus on supportive (physically, emotionally, psychologically), rather than simply barrier-free, environments. Lastly, accepting that engaging end-users in design decisions might be one mechanism for ensuring inclusive-for-all environments, we argue that students need opportunities to build and practice community participation and engagement skills. We describe how we successfully built such opportunities into undergraduate and postgraduate architecture and landscape architecture courses.

### **Introduction**

The concept of Inclusive Design (ID), in accepting the social as opposed to the medical model of disability (Tregaskis, 2002), recognises that people are disabled not by their own cognitive and physical impairments but by environments and products which do not take account of the diverse range of human capability. To address this issue, it emphasises the importance of user involvement, or stakeholder participation, with Morrow (2002, p. 11) arguing that, in the context of environmental design, under ID participatory processes should "extend from initiating the brief, designing and construction, into the processes of feedback and post-occupancy evaluation of the completed environment". ID assumes that by involving users in the design process, the resultant products, services and environments will better address people's diverse needs and interests. In recent years, growing recognition of the profound impacts of population ageing on societies (World Health Organisation, 2002) has given fresh impetus to the aims and concerns of ID.

This approach to design thinking, and the complementary regulatory arrangements which have followed from it, which in the UK include the Disability Discrimination Act (1995), Equality Act (2010) and Part M (2004) of England's building regulations (relating to access to, egress from and circulation within buildings), demanded changes to design pedagogy and revisions to the curricula of design education. However, such reform has been slow to occur. Indeed, the professional criteria for architectural education do not even mention ID specifically, opting instead for a vaguer concern with 'needs of the user', without any requirement for students to really engage with this issue at a more fundamental level.

Larkin, Dell and Hitch (2015, p. 19) argue that concerns for ID found within society, policy and legislation have “yet to transfer to a major shift in the education programmes of architects and designers”. Ostroff (2011, p. 1.9) reports that there are “only a handful of universities around the world where universal design or inclusive design or design for all is even an elective within the professional curriculum”. Furthermore, how to teach and integrate ID principles into architectural education has received little research attention. Notable studies that have sought to address these issues include (Olgunturk and Dermikan, 2009) and (Helvacioğlu and Karamanoglu, 2012) who highlighted the importance of a synthesised approach with discrete ID course vehicles supplemented by an integrative approach in studio. (Christophersen, 2002) who presents 17 innovative ways to teach and implement ID-related thinking across four continents, highlighting approaches which are culturally and contextually appropriate and [author reference] who presents a compendium of participatory design techniques developed for use with older adults. (McGinley and Dong, 2011) reported on effective ways of communicating people-based information, not only to satisfy designer’s data requirements but to establish a sense of empathy with end users.

Innovative approaches to ID pedagogy in the UK exist in a few schools of Architecture and other built environment disciplines. The ‘Breaking down Barriers’ project (BdB), focusses on embedding inclusive design criteria in professional built environment and graphic communication courses at the University of Reading and beyond. The Helen Hamlyn Centre at the Royal College of Art engages students and researchers with business, governmental and voluntary partners to develop innovative solutions to real world problems in the interest of a more inclusive society, irrespective of age and diversity. The University of Sheffield’s ‘Live Projects’ programme engages Masters level students in six week long live projects which engage with real clients on socially engaged and responsible projects.

In the [authors’ institution], ID pedagogy, (or the method and practice of teaching), takes both discrete, combinative and integrative approaches. In this paper, we detail three student projects, located within two degree programmes that engage with ID in interesting and innovative ways.

The first project, ‘Mobility, Mood and Place’, required students to consider how places could be designed collaboratively to make pedestrian mobility easy, enjoyable and meaningful for older people. It engaged students of Architecture and Landscape Architecture together with older adults, (including stroke survivors and those with dementia) in researching and co-designing age-friendly environments in ‘real-world’ contexts – inner city neighbourhoods in Manchester and London. The project offers pedagogic and methodological insights as well as contributions to architects interested in designing places that take into account the needs of older people.

The second project, ‘Civic Fabrication’, considers the theme of social responsibility in the design studio through analysis of three years’ of a five year project, working with final semester undergraduate students in the area of Dalmarnock in Glasgow. It considers the often conflicting requirements of ‘live project’ engagement with both required and desired academic outcomes.

The third project, ‘Drawing the Regulation’, saw students in a non-studio vehicle, a post-graduate architectural management course, engage in a critical discourse with an architectural precedent and its relevant regulatory context. Focussing partially on Part M of England’s building regulations, or Section 4 of the Scottish Technical Standards (STS), the project explored the concept of regulation as a thematic opportunity for designers.

We reflect on the relative advantages offered by these different approaches and, in the conclusions, highlight techniques that appear especially effective in developing students’ knowledge of ID.

## Case Study 1 – Mobility, Mood and Place: Designing age-friendly environments

This project sat within a large interdisciplinary research programme that investigated how we can design environments that foster health, wellbeing, participation and mobility as people age. The student project focused on the physical design of environments from city districts to individual rooms. It required students to re-design real world environments - inner city neighbourhoods in London and Manchester – so that they better met the needs, interests and ambitions of older adults.

Through initial literature, policy and guidance reviews, the students first developed a deep appreciation of the social, economic and environmental factors that might help (or hinder) successful ageing, (WHO, 2007). They then built on this knowledge through various participatory activities completed with diverse older adults.

Within the selected inner city neighbourhoods, guided and facilitated by members of academic staff, the students conducted interviews and focus group discussions with local older adults. These conversations explored older adults' views on the design of neighbourhoods, buildings and other environmental settings. The students also accompanied older adults on walks around the neighbourhoods and explored, in-situ, their views on these locations. Finally, at the neighbourhood in London, the students engaged in various participatory design activities with local older adults. Key activities included creating sketches and constructing 3D models out of foam and plasticine that captured in visual form older adults' views on how the neighbourhood could be re-designed to better meet their needs and interests. See [author reference] for further details on the activities undertaken. Findings from these diverse interactions were captured by the students in field-notes, drawings, photos, films, audio-recordings and models.

Back in the design studio, the students drew on this bank of information, combined with insights gained from their earlier literature, policy and guidance reviews, to produce research drawings that represented and critically interpreted key themes and issues. The students then proposed a manifesto for an architectural project that responded in a positive way to these themes and issues. This manifesto also proposed a programme for an architectural project. This project had to include housing for older people, including housing for people with dementia and in stroke recovery, with related socio-economic and cultural activities. The students had to create a site model, or 'place specific installation', that represented the project. The site based installation was to act as a representational tool which articulated observations about the physical and experiential landscape of the different neighbourhoods. All models were required to be capable of further transformation to accommodate subsequent design iterations. Finally, steered by Gibson's 'Theory of Affordances', the students were required, as part of their architectural project, to design and draw sets of environmental affordance for older adults presenting various conditions including dementia and stroke. Gibson's theory purports that the surfaces or elements of the environment can afford an animal or human-being the opportunity for concrete actions or experiences. "*The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill*". (Gibson, 1979, p. 119).

Midway through the design process, the students returned to the selected neighbourhoods to present their emerging proposals to local older adults for comment and review. Often in the context of informal one-to-one conversations, older adults provided feedback to the students on multiple aspects of their designs from designing for the senses and tranquillity to the orientation of buildings, from public art to the design of pathways and green spaces. The students incorporated this feedback into subsequent iterations of their proposals.



Figure 1a, b and c: Models produced during first and second workshops with older people in Hackney Wick, London.

The final designs produced by the students included many elements of originality. Existing age-friendly guidance was incorporated in a holistic way; from attractive and well defined public space to accessible transport interchanges, well considered surfaces, adequate provision of public toilets, provision of places to rest within the public realm and the provision of well-maintained green space. More thematic environmental concerns such as way-finding, safety and social inclusion were also dealt with in different ways through the provision of intense mixed use public space which included housing for older people in proximity to shopping outlets, theatres and other work-spaces. Clear and navigable urban spaces with appropriate landmarks and elements of orientation were strived for. Older people clearly stated during the participatory design exercises their wish to be included in intergenerational public spaces but with the opportunity to take a more passive role in any public activity. In attempting to address this desire, the students considered in great detail the layers of public space within their designs to afford edges which offered opportunities to ‘retreat, rest and regard’. The layers of defensible space between public and private realms for older people were also the subject of intense design speculation.

### ***Evaluation***

The participatory working between students and older adults that characterised the project was enthusiastically supported by all who took part. The students clearly valued the depth of knowledge and understanding that could be achieved through considered forms of engagement. The wealth of information and insights produced enabled them to develop a deep appreciation of place specific forces from the perspective of a particular user group.

Of surprise to the students was the tenacity and boldness with which the older people generated often daring concepts and design propositions, from the transformation of an existing viaduct into a linear park with housing above in Manchester, to ‘walkways in the sky’ engaging with inaccessible graffiti art in London. The students had anticipated a certain design-based conservatism amongst this age group. However, by directly engaging with older adults these preconceptions were broken down and, through conversations and participatory design tasks, a genuine appreciation of the design interests of this cohort achieved.



Figure 2: Concept drawing for an age friendly Castlefield, Manchester. Knight, Sharpe & Phillips.

An important issue highlighted by the studio was that of communication. In architecture schools, ideas are communicated through drawings, models and terms that can often only be de-coded and understood by individuals with specialist design training. Indeed, the production of such models and drawings, and the use of jargon and technical terms, tends to be actively encouraged in the design curriculum. The students quickly discovered that this approach was entirely inappropriate for communicating their ideas to the older participants. They had to develop a new 'language' with everything from the complexity of visual imagery to the size of text on a drawing needing to be reconsidered and re-designed to ensure clear communication.

Broadening the traditional concerns of design education, the project succeeded in providing the students with new skills in communication, engagement and participatory working, advanced knowledge of the access, lighting, spatial and other requirements of older adults and facilitated a new appreciation of the, often bold, design and aesthetic concerns of one group of non-designers (older adults). By the end of the engagement process students had clearly developed a more empathetic understanding of the needs of the user group and of all of the relevant tasks of effective engagement, the generation of user based-human data and effective design communication and representation. (McGinley & Dong, 2011).

## Case Study 2 - Civic Fabrication: Socially responsible design



Figures 3a and b - Constructing the 'wiki' house at Baltic Street Adventure Playground, Dalmarnock



The focus of the second example is a final-year undergraduate design studio, Civic Fabrication, which combined formal learning - set by the parameters of the traditional studio brief - and informal learning - engaging in the unpredictable experience of live projects. The studio had a concern for ID which the lead tutor interpreted as *'the design of residential schemes and public buildings that actively seek to encourage residents to engage with their social and physical environment and give a sense of community membership, civic pride and by inference, self-worth'*, responding to a priority for a less insular architectural education system (MacLaren, 2013).

The studio focused on Dalmarnock, a neighbourhood to the east end of Glasgow, listed in the Scottish Index of Multiple Deprivation (SIMD, 2016) in the first percentile of the most deprived areas in Scotland. It has undergone successive waves of radical development, post-industrial dereliction, slum clearance, tower block demolition and the more recent, large scale and controversial, surgical interventions to the neighbourhood for the hosting of the 2014 Commonwealth Games. The area is included in a long term, collaborative partnership 'GoWell East', which is monitoring the effects of the regeneration of the area and the Legacy of the Games on public health and wellbeing. (Cleland, Stewart, Clark et al, 2015). Life expectancy, considered as a 'useful proxy indicator of overall health of the population' (Turner, 2008, p. 37) was calculated at 66 years for men in the Glasgow 'GoWell' neighbourhoods in 2005, eight years less than Scotland as a whole and with high rates of death due to lung cancer, alcohol and drug use. Architecture students may engage with areas of urban deprivation, but often with a sense of distance, through research, fieldwork and observation. A key concern in setting up the 'Civic Fabrication' architecture studio in 2013, was to try to avoid a potentially superficial, short-term involvement. Instead, from the start, the staff commitment was to build trust in a community, where the locals were sceptical about external agency, seen as responsible for radical change, but never really attempting to listen to the people. The project was sustained over five successive years and the impact was substantial through physical building and direct engagement with local people not usually involved in a design process.

*'For long-term residents, the feeling of disempowerment had been writ-large in the lead-up to the Games when, in their view, people from outside had dictated what was happening, rather than engaged or consulted with them' (Kidd, Clark and Kearns, 2017, p. 32)*

For the architecture students, the studio was completely beyond their comfort zone and previous academic experience. The socially and ethnically mixed group of students had difficulty understanding the strong Glasgow accents, and their life experiences and expectations could not have been further apart. Critical engagement with research reports on life expectancy, wellbeing and the lack of social mobility came with a sense of shock in respect of the statistics, but to begin to get to know the children, play-workers and families allowed for a different level of experience and understanding of social deprivation.

The project was to consider 'civic-ness' in the neighbourhood's vast cleared areas, with each year group given a slightly different design brief, each with an emphasis on social mobility and wellbeing. This provided a typical studio framework within which the studio worked at different scales from urban to tectonic detail.



Figure 4 - Snapshot of @ESALADalmarnock Twitter feed during the Commonwealth Games, 2014

## Two mechanisms of direct social engagement

A constant over this period was the connection to the local Baltic Street Adventure Playground, which became the key focus of exchange and informal learning. It was set up in 2013 by art and architecture practice, Assemble, together with local arts organisations and play workers. Students volunteered each year, and often each week, to help the children build a treehouse, rope swings, and latterly a wiki-house. (<https://www.eca.ed.ac.uk/news/raising-wikihouse-baltic-street-adventure-playground>)

In the playground, the strict rule was that the children made decisions for themselves, to encourage their capacity for independent action and their ability to affect change, and so became the clients. For the architecture students, these extra-curricular activities were not assessed, but as they had self-selected the design studio unit, there was a prior personal investment in the ethos and social ambitions of the studio from the outset.

## Evaluation

It is difficult to evaluate the effect on the local children of having had contact with University students, beyond establishing trust, being consulted in the design decision making and being involved in the construction directly. This simple measure of inclusion, instils a sense of self-worth and empowerment in the children and the local community. The students ran a series of workshops in advance of the first construction phase of the house, involving the children directly in the design process as well as learning construction skills during the work on site. In the following year, the architecture students from the next year's studio returned to the playground to complete the over-cladding of the wiki-house. Although the students changed each year, the community's trust in the project grew. The 'wiki' house has become a sustainable resource on the playground, which can be further adapted to suit the needs of the children and play-workers.



The effect on the students was very evident. The local play-worker attended studio reviews and asked direct and piercing questions. Introducing users into the studio can be productive as noted by Welsh, “...the faculty found that engaging user consultants in the classroom and studio was the single most valuable strategy for teaching universal design”, (Welsh 1995, quoted in Morrow, 2002, p. 17). As MacLaren (2016, p. 42) notes, much value can be gained by providing students with opportunities to have their work critiqued by non-designers arguing:

“To judge architectural projects only from inside the profession is to shield the students from reality, and prevent them from learning the skills they need to understand and synthesise the needs and aspirations of others, expressed in non-specialist languages and often not articulated clearly.”

In addition, students manned a shop unit over two successive summers, exhibiting their work directly to the general public, engaging local children through direct use of a large urban model and offering free cups of tea. Similar to the students’ experiences in the Mobility, Mood and Place studio, the students at first struggled to express themselves in a way that was understandable to the local people, and through this became aware of how easily they would slip into a highly specialised architectural terminology. They had to learn to present their work to lay people, with an additional hurdle being the local dialect. The model became a highly effective communication tool. Unlike conventional architectural models, it was considered non-precious, and evolved alongside the design process. As a vehicle for social inclusivity, it acted as a focus for expression of views, with the model adapted and painted by the local people. As a (2017) GoWell report notes:

*‘By respecting the subjective experiences of local people, in relation to how it feels to live in an area undergoing rapid and significant change and what different policy interventions mean to them, it may be possible to increase our understanding of the complex mechanisms at work which affect wellbeing and social cohesion, and uncover new avenues for future investigation. (Kidd, Clark and Kearns, 2017, p. 15).*

The studio staff gained a longitudinal perspective on urban development, witnessing some significant change before, during and after the Games, disseminating the project through a Twitter site [@ESALADalmarnock](#), and several academic papers. The students who had been in the unit, became critics in successive years as they moved through the school. The immersion and experiential learning has been highly influential for some students. They were exposed to the contradictions and complexities of the economic and social contexts of Dalmarnock and it was evident that they developed an empathy and personal understanding. One group subsequently set up their own practice ‘Civic Soup’, and another student found employment in the community through a local, well established practice, ‘Pidgin Perfect’, who had been studio critics. In that sense there is some degree of social sustainability.

The limitations of the project are that it was an elective studio, so not mandatory. As such, the teaching and learning of inclusive design remains vulnerable to the individual research interests and motivation of specific studio staff and students.

### **Case Study 3 - Drawing the Regulation: Design responses to regulation**

The Master of Architecture degree in the author’s institution tries to position non-studio subjects to provide a clear relationship to studio working as well as discrete knowledge and understanding. Project 3 relates to a Master of Architecture final year, non-studio course on architectural management, practice and law. ‘Drawing the Regulation’ is a studio based project where students,

working in self-selected pairs, complete two analytical drawings, of a personally selected building precedent, demonstrating how the precedent complies with UK statutory requirements.

### ***The Task***

The drawings are to illustrate a critical understanding not only of how the statutory requirement(s), have been complied with but potentially how this requirement for compliance has been re-defined by the originality of the solution. It could be that the solution offers an added benefit over and above the minimum requirement, or that it actively redefines normative parameters through creative interpretation or originality. Students are permitted to select precedents outside of the UK for study, however the compliance demonstrated must still be in relation to UK legislation. Some students presented a positive or negative critique of their selected precedent either in relation to Gibson's concept of 'affordance', explained above, (Gibson, 1979) or in relation to further relevant regulatory codes where applicable, ie. British Standards.

The project begins with an introductory lecture presenting a series of projects, which in their relationship to their regulatory context represent a series of thematic categories such as 'expressed compliance', 're-defining parameters' or 're-writing the code'. Students then spend around three weeks researching potential projects - presenting options to a member of staff at an early semester tutorial designed to help them make a compelling project selection and to clearly articulate the relationship to the regulation selected. Having done this, the students then work for the remainder of the semester on their analytical drawings, with one further feedback tutorial provided once a draft of the drawing has been produced.

### ***Regulatory Frameworks***

The 3 regulatory frameworks available for study are:

*Planning* – Representing the relationship of the project to key contextual development control guidance, i.e. Local and national development control regulations.

*Building Regulation/ Universal access* - Detailing the strategy for access, circulation and means of escape with reference to Part M of the UK Building regulations or section 4 of the Technical Standards in Scotland.

*Construction Design and Management (CDM)* – Detailing a construction technique or sequence of operations for the building or part of the building which considers a contextual difficulty and the requirement for operative safety.

### ***Student Work***

Many of the projects selected by students were of new and contemporary buildings which re-defined normative parameters. For instance one pair of students assessed London's Shard Building by Renzo Piano-Building Workshop and illustrated how, in wishing to achieve the elegance of a tapered form, English building regulations on vertical means of escape, (requiring separate means of escape for each separate use) could not practically be complied with. The students noted how "*as an alternative and improvement to the regulatory requirement*", the architects designed a hybrid, phased and simultaneous evacuation strategy that utilised lifts as well as stairs in order to evacuate the building (Agrawal, Parker and Slade, 2014).

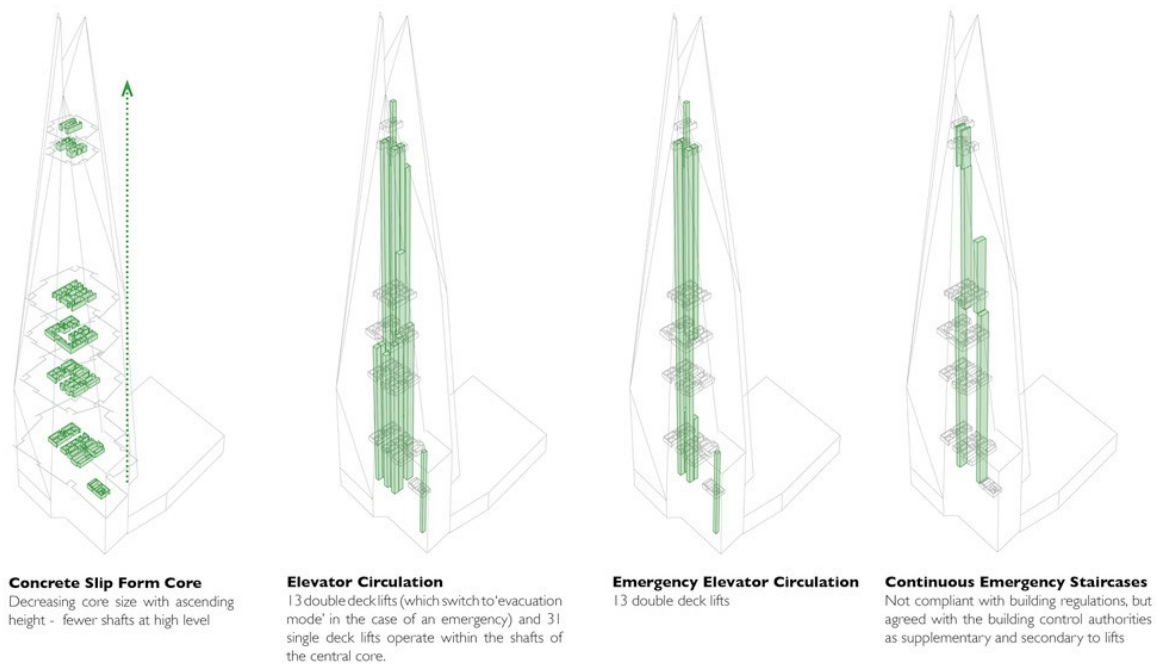


Figure 3: Hybrid evacuation strategy. 'The Shard'. Building Workshop. Drawing by Connel Binnie & Olivia Laughlin

Some, however, selected older buildings and considered their fit with contemporary policy. Another pair of students explored how far Robson Square, a large mixed use landscape and public building complex in Vancouver, Canada met the access requirements included in Section 4 of the Scottish Technical Standards. Robson Square (1979-83) was expressly designed in its physical form to be an icon of inclusive design. The complex covers three city blocks and consists of a landmark civic centre and public plaza, the state law courts, (later converted into the Vancouver Art Gallery), part of the University of British Columbia and government office buildings. Carefully considered public space is woven through the complex. The architect's vision was to offer disabled people the '*front door*' to the complex: through an iconic design move called '*stramps*' – a combination of external stairs and an accessible ramp. The project was lauded by architects and critics as an exemplary piece of inclusive, landscape design and has become a key public space within downtown Vancouver.

The students' critical analysis centred on subjecting the design to a rigorous application of Section 4 of the Scottish Technical Standards (STS), illustrating all of the instances where the design did not comply in relation to safety and access. Problems were clearly illustrated, contextual difficulties acknowledged and in some instances alternative solutions proposed.

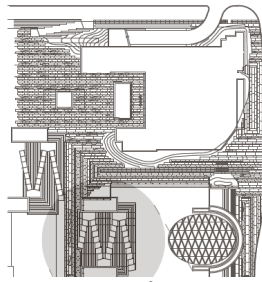
While acknowledging that the critique subjects the design to a higher standard of regulation than that to which it was subject at the time of its design and construction, nevertheless some surprising flaws were highlighted. The assessment centres on the fact that in presenting itself as an icon of ID through its material and formal expression, the design becomes *more* problematic in not satisfying some basic criteria for suitable and inclusive access. The limit allowed for the height of stair risers was, for example, found to be exceeded in some instances resulting in a trip hazard, while the stone used on the ramp and stairs was found to be of the same colour and materiality making the visual differentiation of edges more difficult, especially for people with visual impairment.

## CIRCUMVENTING CIRCULATION

How does the design and classification of the Robson Square access solution skirt around access regulations?

Robson Square (1977-83) is the physical embodiment of the theme of integration. Designed by Arthur Erickson, the civic complex covers three city blocks and, despite its scale, was conceived as a singular entity. The complex comprises a courtyard (later converted into the Vancouver Art Gallery in 1989) and a number of office buildings. Carefully

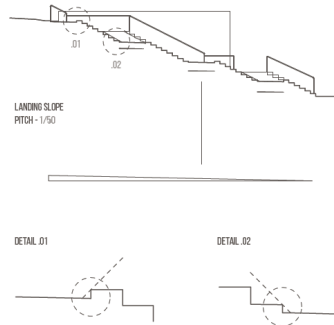
considered public space is woven through the complex. Erickson's vision was to offer disabled people a 'free door' to the complex: this was achieved through iconic 'tramps' - a combination of stairs and an accessible ramp. It is a bold move, both architecturally and civically, to integrate access in this way. The building has been lauded by architects and critics as an exemplary piece of landscape design, and has become a key public space within downtown Vancouver.



.A

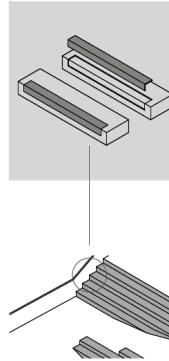
As the ramp provides an intermediate landing for the stair flights, these landings are not flat, and the effective height of some risers falls below the allowed limits, causing a tripping hazard (4.3.6). The pitch of the slope in this case is typically 1:50. In some cases, the number of risers in a flight

drops below three, near the beginning/end of a ramp. (4.3.4) Details 01 and 02 show how shifting riser height may cause a tripping hazard.



.B

The stone is all the same colour. Contrasting stair nosings are required, with a sufficient level of contrast so that risers can be identified (4.3.5). This could be achieved through tiled stone to maintain the elegant material language.



.C

Provision of handrails is insufficient, and existing handrails end abruptly. As the flights are wider than 2.3m, there should be a handrail every 1.5-1.8m (4.3.4). A plan below shows a compliant arrangement of handrails, however it would seriously impact the architectural expression. The handrail requires an extension of at least 300mm beyond the top and bottom of the flight (4.3.4)

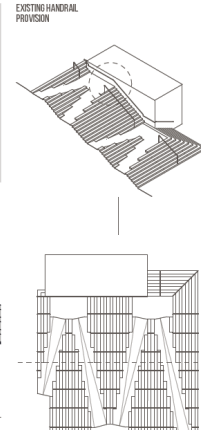


Figure 6: Excerpt from Drawing; Circumventing Circulation. Adam Kelly & Adam McFall.

### Evaluation

All students engaged enthusiastically with the drawing task and many of the studies elicited interesting and compelling relationships between buildings, places and their relevant regulatory frameworks. Researching interesting precedents with a thematic relationship to their regulatory context proved one of the most difficult tasks, as projects tend to be presented in the available literature in relation to their formal, spatial and material characteristics rather than as a response to the rules which helped to generate them. The establishment of a mind-set in the students where rules are seen as opportunities rather than barriers to good design appeared to be a success.

### Conclusions

The educational projects highlighted here contain both implicit and explicit strategies for teaching inclusive design. In the first project 'Mobility, Mood and Place', students learned about the needs of a particular user group through engaging with them in both researching and uncovering place related issues and generating propositions. The careful design and placement of those forms of engagement in the studio curriculum then allowed students time to critically analyse the data produced and to carefully consider the ways in which it could help in generating age-friendly propositions.

The second project in Dalmarnock illustrated the benefits of immersing a group of students in a real-world context with a live-project scenario and all of the real problems which cannot be effectively re-created in the academic studio environment. Concrete learning relating to issues ranging from establishing trust, to appropriate ways of exhibiting work and effective communication resulted. The third project exists within the confines of the academic environment but attempts to promote in students an attitude which seeks to go beyond regulatory compliance in the interests of all users of the built environment.

A key perennial issue relating to effective teaching of inclusive design is the continuing **vulnerability of the topic within the core curriculum**.

Helvacioğlu and Karamanoglu (2012) argue that inclusive design thinking, although 'a critical approach to design practices', is usually only taught in elective courses. Both the Mobility, Mood and Place and Civic Fabrication studios were indeed elective studios, while the regulatory drawing exercise occurred within a Masters, compulsory non-studio course in architectural management. The deep engagement they provided with inclusive design principles was an optional extra, rather than a

core component of students' design education. All students at the first and second authors' institution benefit from at least one lecture on ID as part of their core professional studies lecture programme, but a single lecture cannot hope to replicate the level of knowledge students acquire in a semester or year-long immersive studio. From a more positive viewpoint, elective studios allow students to learn with a tutor who is passionate about the topic while the smaller class sizes provide opportunities for one-to-one instruction.

***Direct and real forms of engagement with real people and projects*** is we believe a cornerstone of effective ID pedagogy. Given the pressures of the core curriculum in architecture schools, it is not always possible to give students an immersive, direct engagement with external user groups. Yet as noted by CABE (2008, p. 7), '*consultation is key to inclusive design....This is where involvement of groups not usually included in the design and planning process can really make a difference*'. In the Mobility, Mood and Place and Civic Fabrication studios there was a sustained aim to embed a pedagogical methodology that allowed students to develop their understanding of the needs of specific social groups by directly engaging with them. In each case there were measurable and tangible gains in addition to clear evidence that some students were profoundly affected by this direct experiential learning. In the Mobility, Mood and Place studio, for example, students' preconceptions about the design concerns of older adults were found to be wholly misguided leaving them with a new appreciation of the aesthetic interests of one set of non-designers.

Lastly, we would advocate the ***engagement of students with regulatory frameworks*** in ways which allow them to see beyond regulations as barriers to good inclusive design. We would encourage students and their teachers to engage in a critical and creative engagement with all forms of built environment regulation. Imrie and Street (2011) explored practicing architect's attitudes to planning and building regulations. Most viewed both forms of regulation as an impediment to good design rather than providing a platform for innovation. It was also clear that architects generally felt excluded from the 'regulation making' process. Through a direct and critical engagement with forms of regulation in the 'Drawing the Regulation' project, particularly those relating to universal access and the architectural assemblies that result, students were encouraged to view regulatory engagement as providing an opportunity not only to comply with the law but also potentially to improve upon it through creative innovation or the re-framing of the regulation itself *in the interests of a better outcome*. Particularly useful seemed to be the focus on placing regulation in a real context with students asked to consider the relationship between built projects and relevant statutory requirements.

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